

7 Overview of Current Non-ARB Research Efforts

7.3 Proximate Modeling of Weekday versus Weekend Ozone - ENVIRON

7.3.1 Study Objectives:

- 1) Investigate WD/WE emissions/air quality relationships for Los Angeles:

Ozone

precursors: HC, NO_x, HC/NO_x

NO_y or NO_z, ozone /NO_z ratios

- 2) Evaluate several hypotheses for mid 1990s
- 3) Evaluate most promising hypotheses for mid 1980s
- 4) Project impact of some hypotheses in 2010

7.3.2 Proposed Simulations:

Base Case

The base case simulation should already be available from Task 1. The objective is to develop a simulation with 6 days. For the base case all the days will be modeled with the standard SCAQMD inventory which is representative of weekday (WD) activity levels:

Simulation Day	1	2	3	4	5	6
Emissions Type	WD	WD	WD	WD	WD	WD

Hypothesis 1. Reduced mass of NO_x emissions on weekends due to reduced truck traffic

Prepare Saturday and Sunday emissions with mobile source NO_x emissions reduced to account for less truck traffic. Two model runs will be performed:

(1a) NO_x emission reduction set #1

(1b) NO_x emission reduction set #2

The different levels of reduction would most likely alter the balance between the Saturday and Sunday reduction levels. The sequence of simulation days would be:

Simulation Day	1	2	3	4	5	6
Emissions Type	WD	WD	WD	SAT	SUN	WD

Hypothesis 2. Different diurnal and spatial pattern of on-road mobile emissions on weekends

Prepare Saturday and Sunday emissions with different diurnal profiles and spatial distributions for on-road mobile sources. Five model runs:

(2a) diurnal profile set #1

(2b) diurnal profile set #2

(2c) combined diurnal profile and total mass change

(2d) different spatial distribution

(2e) combined diurnal profile/spatial distribution change

The diurnal profile, total mass and spatial pattern of emissions will be varied independently and in combination and the five simulations shown are one possible set.

The sequence of simulation days is:

Simulation Day	1	2	3	4	5	6
Emissions Type	WD	WD	WD	SAT	SUN	WD

Hypothesis 3. Difference in the mass and diurnal pattern of onroad mobile emissions on Fridays

Prepare Friday emissions with different diurnal profiles and total mass for on-road mobile sources. Use SAT and SUN emission files from hypothesis 2 (presumably simulation 2e). For Friday emission changes to impact weekend

ozone invokes some degree of carryover. To investigate this we propose two simulations that have the same Friday emissions but different weekend emissions:

Simulation Day	1	2	3	4	5	6
3a) Emissions Type	WD	WD	FRI	SAT	SUN	WD
3b) Emissions Type	WD	WD	FRI	WD	WD	WD

Simulation (3a) would be compared to (2e) whereas (3b) would be compared to the base case. This will investigate whether any Friday impact on weekend ozone depends on the sequence of days that follows

Hypothesis 4. Carryover of emissions effects

Evaluation of this hypothesis would use FRI, SAT and SUN emission files developed for previous hypotheses (presumably the same as used in hypothesis 3). Only one new simulation is needed for the analysis. The effect on Sunday of carryover from preceding days will be examined by comparing (4a) with (2e) and (3a). The effect on Saturday of carryover from Friday has already been considered in hypothesis 3 by comparing (3a) with (2e).

Simulation Day	1	2	3	4	5	6
4a) Emissions Type	WD	WD	WD	WD	SUN	WD
2e) Emissions Type	WD	WD	WD	SAT	SUN	WD
3a) Emissions Type	WD	WD	FRI	SAT	SUN	WD

Hypothesis 5. Increased emissions from recreational activities on weekends

Prepare emission inventories with increased emissions from recreational vehicles and marine vessels. It is unclear whether to also include lawn and garden equipment due to the trade-off between commercial and residential use. One model runs with the sequence of simulation days:

Simulation Day	1	2	3	4	5	6
Emissions Type	WD	WD	WD	SAT	SUN	WD

Hypothesis 6. Reduced emissions from commercial activities on weekends

Prepare emission inventories with reduced emissions from commercial activities. The main impact is expected to be from the “construction equipment” and “commercial and industrial equipment” sectors. One model runs with the sequence of simulation days:

Simulation Day	1	2	3	4	5	6
Emissions Type	WD	WD	WD	SAT	SUN	WD